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An Overview of the ARCO Project

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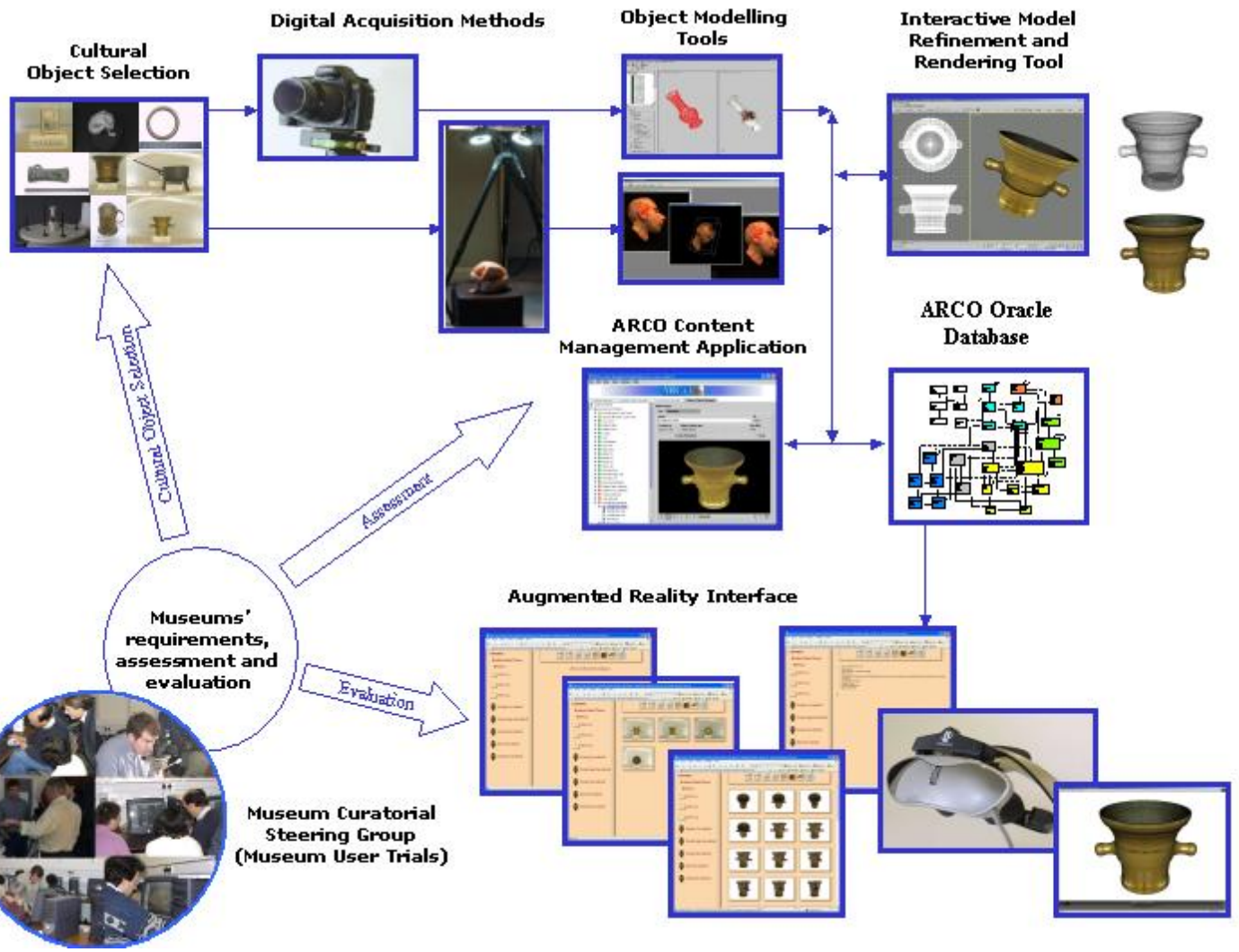
- ARCO Project goals
- Prototype systems and components
- Digitisation of artefacts
- 3D modelling and refinement
- Storing and managing cultural objects
- ARCO data model
- Metadata in ARCO
- Visualisation of digitised artefacts

Goals of the ARCO Project

- Develop innovative technology and expertise to help museums **Create**, **Manipulate**, **Manage** and **Present** cultural objects in virtual exhibitions both within museums and over the Web
- Why?
  - To allow museums to create virtual museums and galleries
  - To enable interaction with digital representations of collections
- How? By building a set of tools and processes from digitisation to visualisation:
  - **Digital capture of artefacts**, **3D modelling and refinement**, **Database and content management**, **Visualisation in virtual or augmented reality environments**
  - **Interoperability** i.e. an Open Architecture
    - XML Data Exchange between tools and other systems
    - Internet, Web, graphics and metadata standards

ARCO Prototype Systems and Components



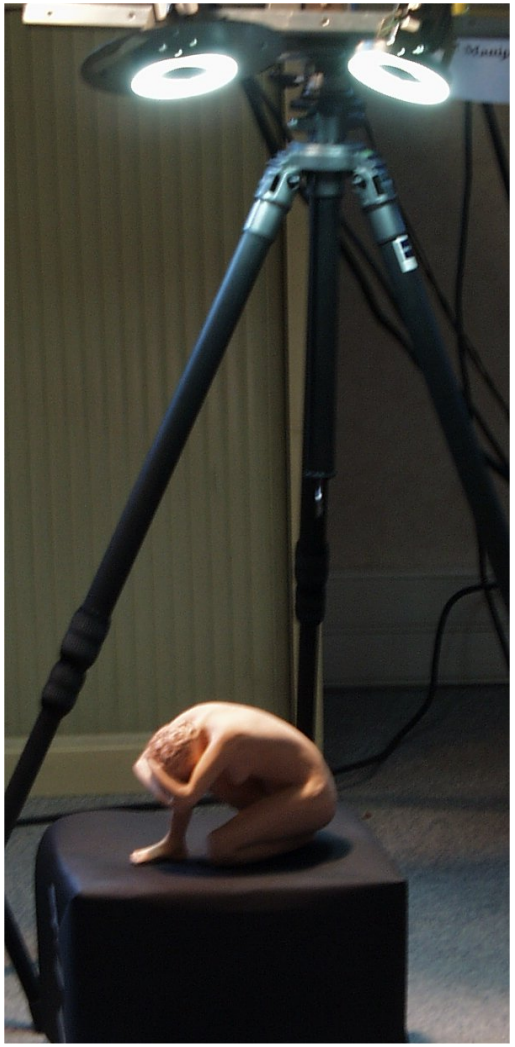
Create: Digitise Artefacts with the Object Modeller

Method of modelling depends on features of the objects

- Objects with simple geometry are modelled with modified 3ds max or Maya

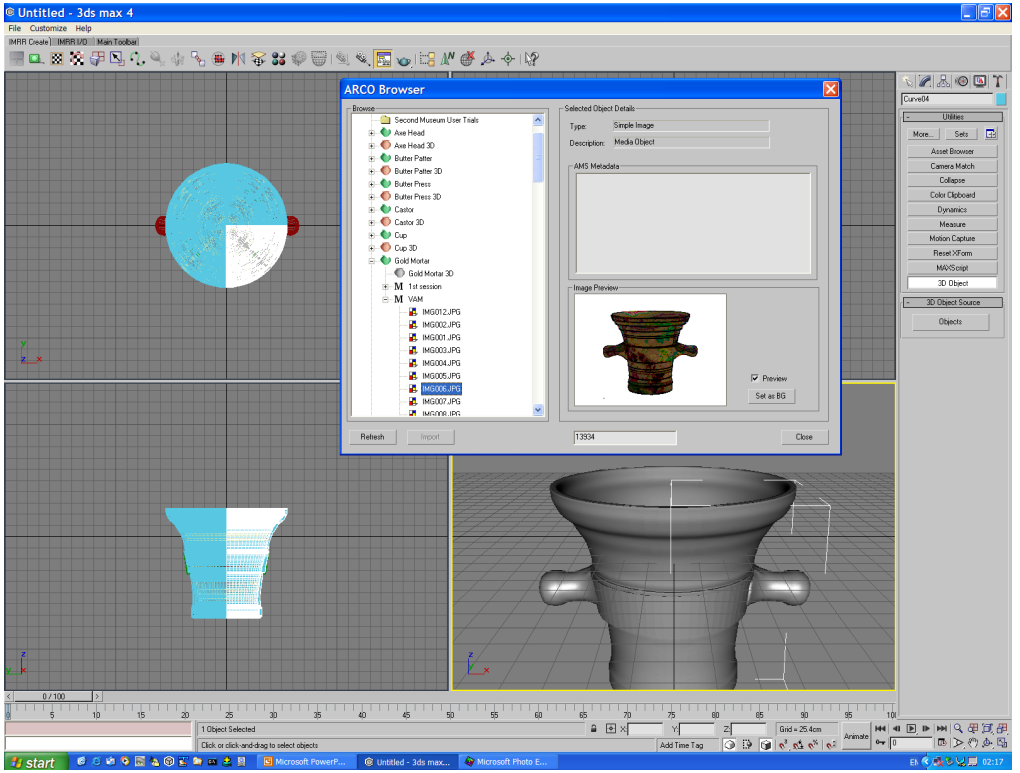
For complex models we use a custom built stereo digital camera system:

- Portable in order to gain access to fragile artefacts
- Ease of use for museum staff who are not experts in 3D measurement
- Result should be an accurate 3D model of the artefact



Manipulate: 3D Modelling and Refinement

- A tool for Interactive Model Refinement and Rendering
- Creation of simple models and refinement of digitised models
- Database connectivity



Media Objects from Creation & Manipulation Stages

Sample media objects representing cultural objects in the database:

- Images from the photogrammetry process (OM)
- VRML models exported from model refinement (IMRR)

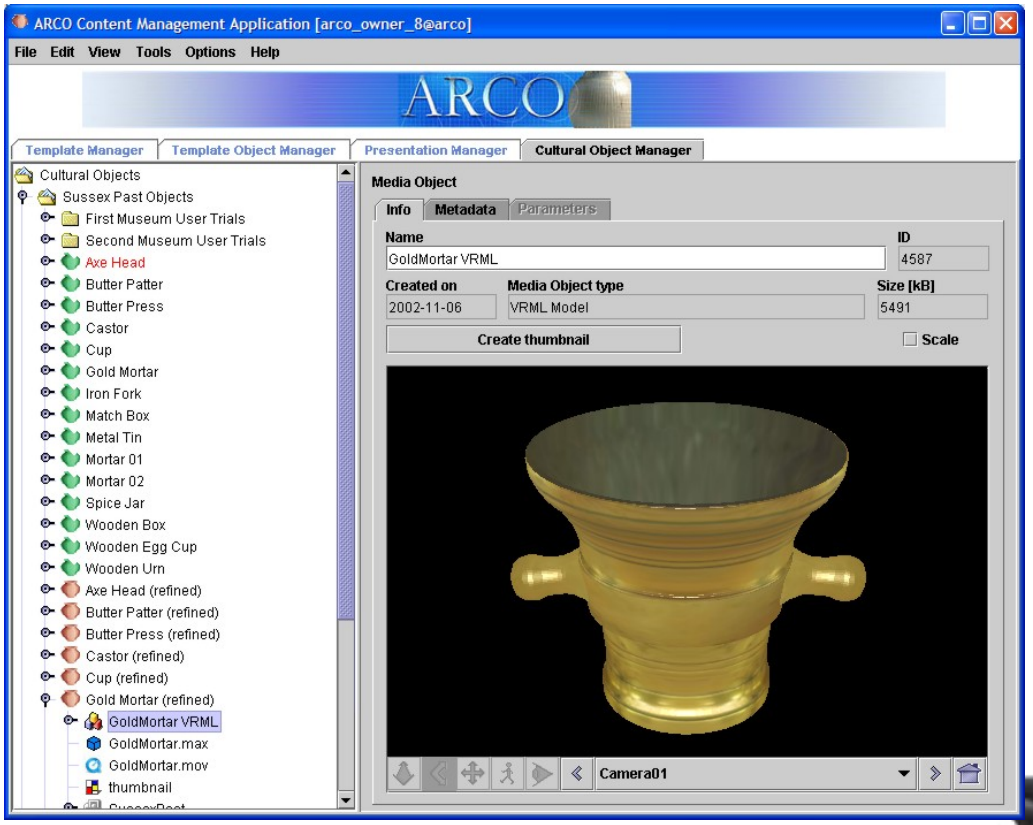






Manage: Content Management Application

- All ARCO data is stored in a database for consistency
- Museums do not manage the database directly, but through a specific application (ACMA -ARCO Content Management Application)
- ACMA provides several managers for ease of data manipulation, e.g.
  - Cultural objects
  - X-VRML templates
  - Virtual exhibitions



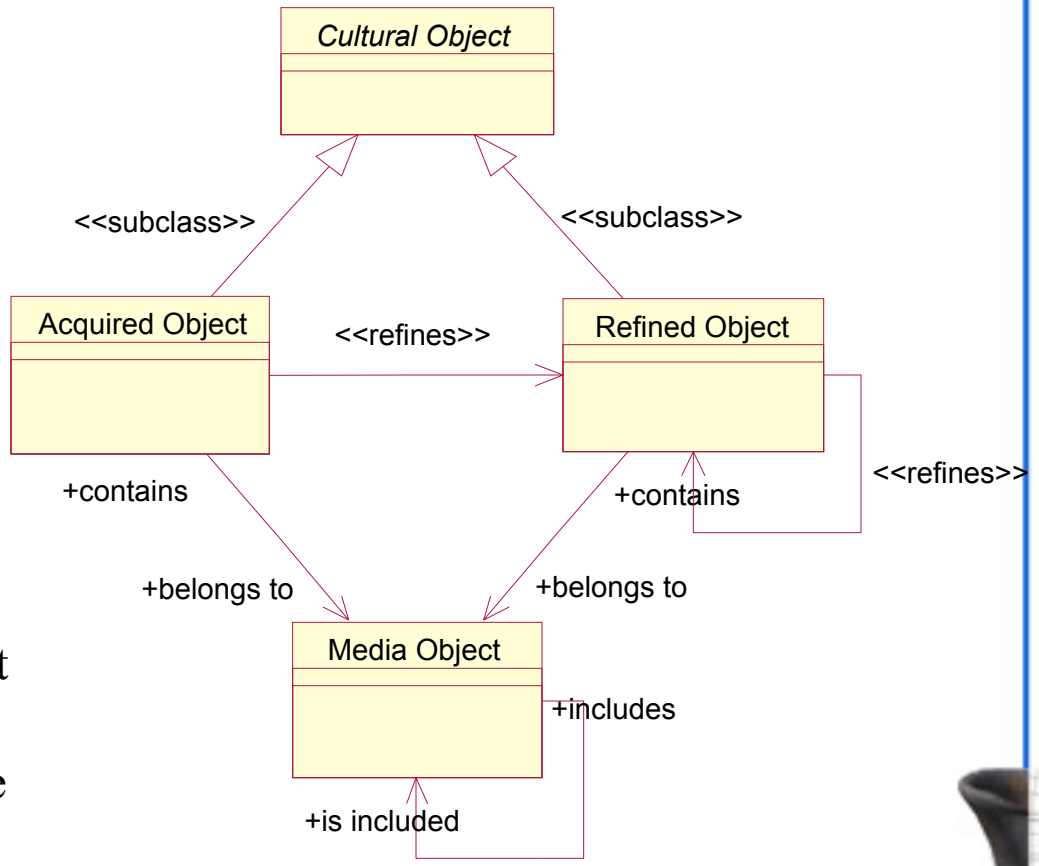
ARCO Data Model

Cultural Object: descriptive curatorial metadata, surrogate for the physical artefact

Acquired Object: digital representation of the physical artefact

Refined Object: acquired (or refined) object which has been modified

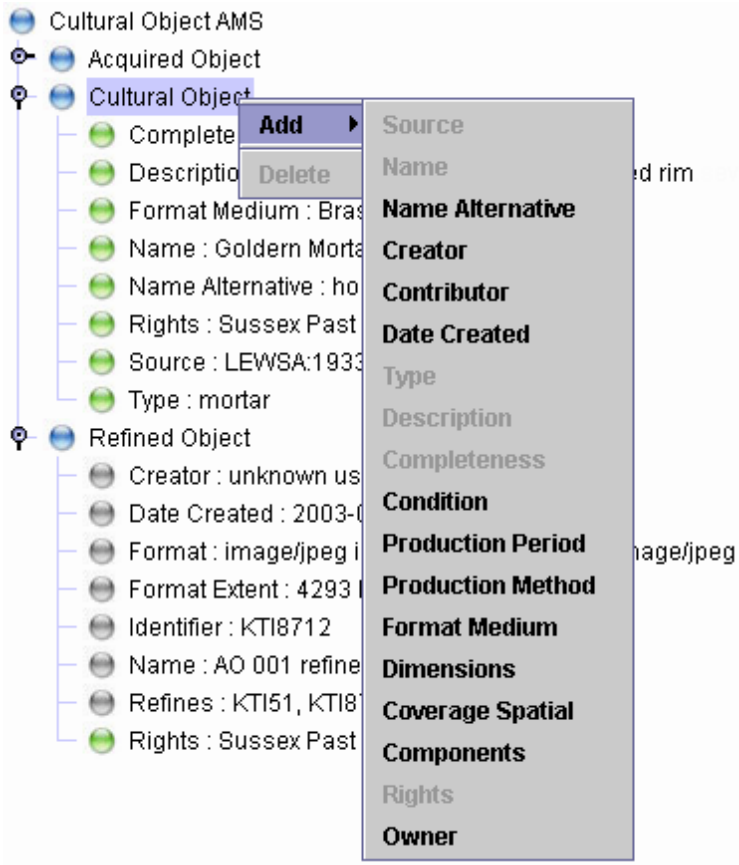
Media Object: individual object which makes up a digital representation (3D model, texture maps, description etc.)



Interoperability: Metadata for Digital Artefacts

- AMS –ARCO Metadata Schema, is a vocabulary for describing processes from digitisation to visualisation:
  - Resource discovery metadata (DCMES)
  - Descriptive curatorial metadata (mda SPECTRUM)
  - Technical metadata (preservation)
  - Themed metadata (intelligence, effort report)
  - ARCO specific elements
- Interoperability
  - Data exchange between ARCO components
  - Cross domain and compatibility with museum best practice
- Implemented with XML Schemas

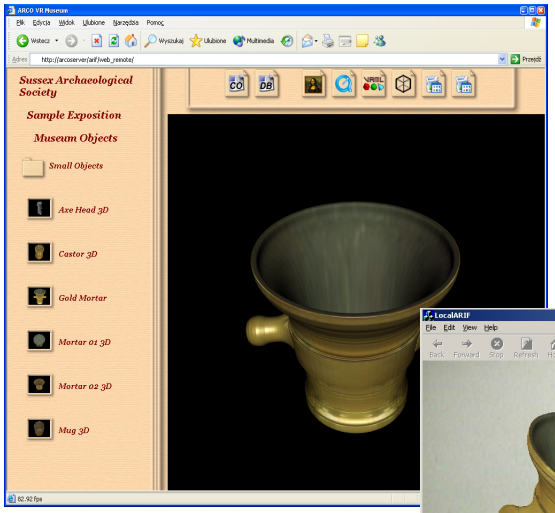
AMS Metadata Editor

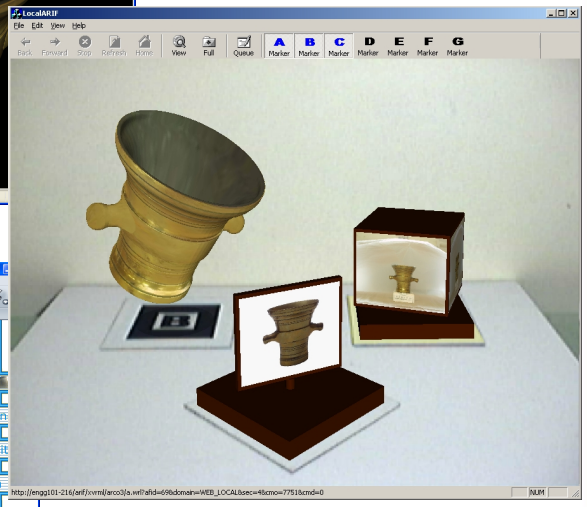


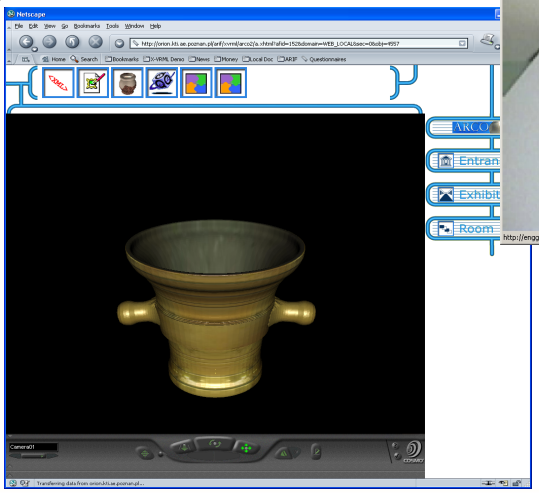
Presentation: Augmented Reality Interfaces

- Visualisation of ARCO media objects from the database

  (e.g. VRML models, metadata, images, virtual exhibitions)
- Three visualisation interfaces
  - Remote Web Interface
  - Local Web Interfaces
  - Local AR version based on ARToolKit







Conclusions

- ARCO is developing an open architecture that integrates state-of-the-art with ARCO specific technologies to enable museums to build virtual exhibitions
  - Digitisation and modelling of 3D museum artefacts (OM)
  - Refinement and creation of the 3D virtual museum artefacts (IMRR)
  - Object relational database and content management (ACMA)
  - Visualisation of museum exhibits in virtual environments (ARIF)
  - Integrated through XML technologies (X-VRML, AMS, XDE)
- Visit us at the ARCO website:
  - http://www.arco-web.org/